Early Screening of Breast Cancer in Korea

Korean Breast Cancer Society

The overall mortality in Korea was 522.7 persons per 100,000 populations as of 1999, among whom about 22%, 114.7 persons, had died of cancer. Among 5 biggest causes of death, the number of deaths due to cerebrovascular disease, accidents, cardiovascular disease, and liver diseases decreased for the past decade, whereas the number of deaths due to cancer is steady on the rise with the number of cancer registered each year also increasing. The 6 most prevalent cancers in Korea, occupying 2/3 of all cancer developed, are stomach, liver, colon, breast, and cervical cancer.

Breast cancer is the second most prevalent cancer in Korean women. The incidence of breast cancer being 16.7 persons per 100,000 populations as of 1996 had increased to 20.3 persons in 1998 and was estimated to be 22.9 persons in the year 2000. It is expected to increase steadily with the westernization of lifestyle such as increased fat intake together with the exposure to hormone related risk factors such as early menarche, late menopause, no or late birth, hormone replacement therapy, and so on.

After the late 1990's the incidence of breast cancer is steadily on the rise but the mortality due to this cancer is steadily declining in US and England. The main causes of this decline are thought to be early screening and more importantly, improvement of treatment. Although the incidence of breast cancer in Korea is about 1/4 less than the incidences in these countries, it is expected to be near their rates. It is hard to change risk factors for breast cancer. Therefore, early screening is the best strategies to prevent and manage breast cancer at this time as public health measures.

The epidemiology of breast cancer, appropriate methods of screening, proposals made in other countries, and current status of early screening in Korea are discussed here. The recommendations which were made in the 1st Consensus meeting by experts from the National Cancer Center and Korean Breast Cancer Society in 2001 is also introduced in the present paper.

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1. Epidemiology of breast cancer

Two epidemiological issues that need to be clarify in establishing a proposal for early screening for breast cancer are ① whether the incidence of breast cancer would continue to increase in Korea and ② whether the age-specific incidence curve of breast cancer would change in the future.

A. Would the incidence of breast cancer continue to increase in Korea?

The incidence of breast cancer in Korea is lower than, of course, those of Western countries, and is lower than those of Japan and China. However, it is on the rise after 1980 and is expected to rise in the future. This increase signifies that the factors inducing breast cancer are inherently present within the woman population and is backed by the following evidence.

1) Speed of epidemiological changes: Table 1 shows the reclassification according to the international classification of diseases (ICD) and time series analysis of the causes of death in Koreans after 1960. The major causes of death in Koreans including cancers show the western pattern. The time took for epidemiological changes was more than 200 years in Western and European countries, whereas it was between 30～40 years in Korea as in Japan. This figure is evidence of drastic increase in the incidence of breast cancer in the future.

2) The incidence of breast cancer has already has begun to increase: According to the results of central cancer registry project, 5,203 women were affected by breast cancer throughout Korea and about 1,000 expected to have died in 1999. The age-specific incidence rate for breast cancer was 10.91 persons/100,000 population between 1988～1989 in Korea. It was 20.8 persons/100,000 population between 1993～1997 in Seoul. The age-specific incidence rate for mortality was 4.4 persons/100,000 population between 1992～1995 in Seoul. Furthermore, it is clear that the incidence and mortality of breast cancer has continued to increase steadily for the past decade.

Table 1. Time serial figures on the causes of death in Koreans (1960～1990)

Causes of death (ICD)	'61	'65	'70	'74	'80	'90
Infectious and parasitic diseases (001～139)	3	4	3	4	6	6
Malignant neoplasm's (140～239)	5	5	4	3	2	2
Endocrine, nutrition and metabolism related (240～279)	6	7	7	8	8	7
Diseases of the nervous and sensory systems (320～389)	4	3	8	9	7	8
Diseases of the circulatory system (390～59)	7	6	1	1	1	1
Diseases of the respiratory system (460～519)	1	1	2	5	5	5
Diseases of the digestive system (520～579)	2	2	6	6	4	4
Diseases of the urinary and reproductive systems (580～629)	9	9	9	7	9	9
Injury and addiction (800～999)	8	8	5	2	3	3

Table 2. Incidence of breast cancer according to ages (per 100,000 population)

Age (yrs)	Recipients of medical insurance (Korea-wide, 1988～89)	Regional cancer registry project (Seoul, 1993～1997)	Regional cancer registry project (Gangwha, 1986～1992)
0～4		0.2	
5～9		0.1	
10～14		0.0	
15～19	0.0	0.2	
20～24	0.6	1.2	
25～29	4.0	5.1	
30～34	12.8	17.2	
35～39	20.4	30.8	
40～44	30.8	48.3	52.2
45～49	33.5	66.5	5.6
50～54	36.2	64.0	16.6
55～59	27.0	61.8	36.0
60～64	24.5	49.2	22.2
65～69	13.5	46.6	8.6
70～74	14.8	41.5	11.9
75～79	6.2	35.0	
80～		23.1	
Crude incidence rates	9.92	22.2	8.7
Overall incidence rates	10.91	20.8	7.1

3) Speed of breast cancer development in immigrants: One characteristic fact among the epidemiological findings of breast cancer is that the incidence is significantly lower in Asian women compared with in Western women. In determining whether a disease is due to environmental factors or genetic factors, important evidence could be found by comparing different groups of immigrants. The incidence of breast cancer in Korean women residing in Los Angeles in US was 16.9 persons/100,000 population in 1987, showing no difference from the incidence in Korean women residing in Korea due to a short history of immigration. However, the incidence continually increased to 28.5 persons/100,000 population by 1992, surpassing the incidence of Korean women residing in Korea. Furthermore, it was reported that the incidence was at least 2.5 times higher in Japanese and Chinese immigrants compared with women in their native lands. Thus, the incidence of breast cancer is expected to rise in Korea as long as the current environment for breast cancer persists.

4) Same risk factors of breast cancer as in Western women: Despite the estimation that the incidence of breast

cancer in Korean women would be significantly lower than that in Western women, the incidence of breast cancer is high in women residing in large cities, so-called westernized environment. The incidence is continue to rise compared with the past probably signify that the incidence is speeding up with the risk factors inducing breast cancer inherently present.

According to the epidemiological studies performed in Korea, the risk factors of breast cancer are ① the age after 50's, ② family history of breast cancer, ③ early menarche before the age of 14 years, ④ late menopause after the age of 50 years, ⑤ no full-term birth, ⑥ first full-term birth after the age of 35 years, ⑦ no breastfeeding, and ⑧ weight over 64 kg or BMI over 25. Thus, the estrogen-augmented-by-progesterone hypothesis proposed in Western women is also applicable in Korean women whose incidence of breast cancer is significantly lower. Furthermore, the social phenomena such as aging population, early menarche, late menopause, remaining single, marrying late, avoiding breastfeeding, and obesity during the adolescent period would be sufficient in speeding up the development of breast cancer as far as there are no other genetic polymorphisms different from those in Westerners.

B. Would the age-specific incidence curve of breast cancer change?

The age-specific incidence rate of breast cancer is not only evidence related with the cause of disease but also is very important in selecting high-risk groups or establishing screening program. The current age curve of Korean women is very unique and screening program for breast cancer should be established based on this age curve provided that this age curve would not change in the future. And if this age curve is to change in the future, feasible measures should be prepared accordingly.

In the age-specific curve in Korean women, breast cancer is rare in women in 20's, starts to increase after 30's, increases drastically in 40's, is the highest around the age of 50, and gradually decreases afterwards. According to statistics in 1999, among the total breast cancer cases, 2.8% were under the age of 20, 22.5% were women in 30's, 37.3% in 40's, 23.5% in 50's, and 13.9% older than the age of 60, in which the distribution of breast cancer in women in their 30's to 40's was characteristically high compared with their Western counterparts.

The fact that breast cancer in Korea would increase steadily in the future was mentioned earlier. In order to find the answer to the question whether the current age curve of breast cancer would change accordingly, we need to analyze why these phenomenon happens. The age curve of breast cancer forming an inverted "V"-shape"(Λ) curve could be examined with ① the "biologic age effect" in which the exposure to the risk factors differs around the apex of the curve and ② the "cohort effect" in which the incidence of breast cancer is lower in older women compared with younger women since the concentration exposed to and period of exposure to estrogenic hormone in older women are less. These two effects are all based on the hypothesis that estrogenic hormone participates in the reproductive processes such as menstruation and births function as the cause of breast cancer.

As shown in Fig. 1, the age curve in Japan having slightly higher than in Korea. It also shows the peak around the age of 45 years and decline afterwards. This pattern has not changed much from 1975 to 1985. Then, the question would

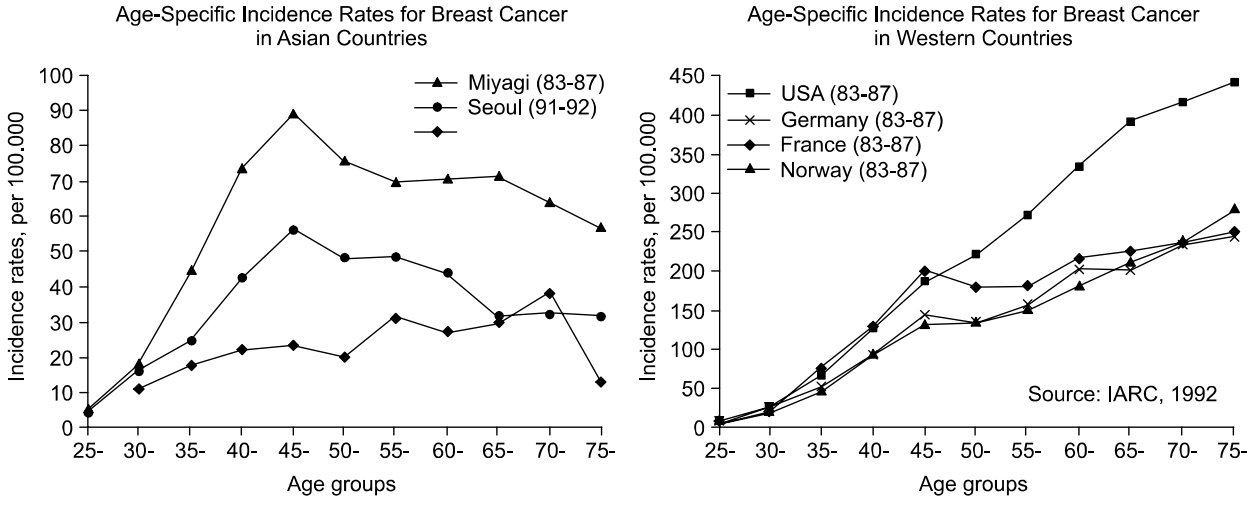


Fig. 1. Age specific curves of breast cancer in Asians and Westerners.

be whether this pattern of age curve is unique to Asians. However, the interpretation could be done from a different angle when the age curve of Westerners is examined in Fig. 1. In other words, the pattern of gradual increase and halt or decrease is seen in populations with low incidences such as in Korea and Japan, whereas the steady increase with increasing age is seen in populations with high incidences.

Provided that the causes of breast cancer are not different between Asians and Westerners. The level of incidence is only different, the interpretation with ② the "cohort effect", in which the pattern of the age curve in Korea or Japan would change more toward the pattern in Western countries in the near future, would be more convincing for accounting for the difference in age curve amongst countries than ① the "biologic age effect". The phenomenon of mixing those groups with high incidences and those groups with low incidences could account for the increasing pattern of breast cancer.

2. Benefits of mammography and early screening

Screening is clinical examination for a specific disease in people with no specific symptoms for the disease. The main purpose of screening is to decrease the mortality due to the disease through early diagnosis and treatment.

It is known that it takes about 5 to 15 years for breast cancer to develop. The time points to stop the natural course of breast cancer are ① the early stage when the unlimited proliferation of damaged breast cancer cells occurs by limiting or blocking the chance to be exposed to carcinogens, ② the precursor stage when the progression to breast cancer has not begun by halting or reversing cellular growth, and ③ the precursor stage of cancer or early breast cancer stage before clinical symptoms are present by removing or necrotizing the lesion. It has to have the minimum diameter of 1 cm for a palpable mass and about 4-7 years would take to reach this size. Thus, the diagnosis is only possible during the detectable preclinical phase through special tests (screening such as mammography) when no specific symptom is present. For the purpose of early screening in the second stage, the methods can be used are mammography in which a small dose of x-ray is used to take the images of actual internal breast structure, clinical breast examination (CBE) performed by clinicians and regular breast self-examination (BSE) performed by women themselves when no symptom is present.

1) Breast self-examination (BSE)

The purpose of BSE lies in detecting any abnormality of breasts by a woman herself by palpating her breasts. According to a survey done by the American college of Surgeons, 73% of breast cancer patients detected cancer through BSE. However, there is no data on the accuracy of BSE. Most studies reported a low sensitivity of BSE at between 12～25% with the decreasing sensitivity with increasing patient age (35～39 years: 41%, 60～74 years: 21%). Although it is believed that training women using a doll or breast model would increase the sensitivity of BSE, no difference was seen between the group of people who received training on BSE and the group of people who did not receive the training according to a prospective study done in Sanghai and Leningradians. Only that the frequency visiting doctors and the number of mammography increased in the group of people who received the training.

2) Clinical breast examination (CBE)

CBE is an important part in the detection of breast cancer and clinical diagnosis of pathology. Physical examination of breast is subjective and could lag in the rate of reappearance, It was reported that experienced physicians could discriminate the malignancy of breast tumor in about 70～90% and their diagnosis rate of benign disease is in about 90%.

3) Mammography

The purpose of screening mammography is different from that of diagnostic mammography. Screening mammography is performed to find lesions within the breast with its sensitivity and cost-effectiveness maximized. Randomized clinical trials were done to determine the effectiveness of screening mammography for the past 30 years. The results were significant in that screening decreased the mortality by 30% in women older than 50 years and were insignificant in that it did not decrease the mortality in women under the age of 40 years. According to a follow-up study done for 8～12 years in women in 40's, the mortality decrease in some women in their 40's; however, this result was probably the delay effect in women in 50's who had participated in the study in their 40's.

4) Benefits of early screening

(1) Decreased mortality due to breast cancer: The most significant effect of early screening is the decreased mortality due to breast cancer. According to studies done in US and some European countries, the consensus was reached on the fact that mammography significantly decreased the mortality in women in 50's but there is the controversy over the effectiveness of mammography in women under the age of 50 years. According

to a randomized trial done in 1963 by Health Insurance Plan in US, the mortality due to breast cancer in women under the age of 50 years was decreased by about 25% compared with that in women who did not undergo mammography. The decrease was between 27～44% according to the Swedish study done in, Malmo and Two County, Stockholm, and Guthenburg. And it was 23% decrease according to the Edinburg study in England. According to the meta-analysis, the degree of comparative risk of mortality due to breast cancer was decreased by 0.76 (0.67～0.81) times in women between 50～74 years and 0.85 (0.68～1.08) times in women between 40～49 years.

It is also accepted in Japan that mammography decreased mortality a minimum of 30% in women older than 50 years of age and about 10% in women under 40 years, placing mammography as a very important method for early diagnosis of breast cancer; however, this procedure is not carried out at the national level. On the other hand, the effectiveness of CBE chosen as the standard method is examined through different studies. According to the analysis done with data between 1985～1995, CBE also decreased mortality due to breast cancer by up to 0.77 times, showing the effectiveness in early screening for breast cancer; thus, CBE is utilized in the guidelines starting in 2000. Furthermore, the probability of detecting stage I breast cancer when BSE is performed every month is more than 3 times compared with women who do not perform BSE, and the detection is possible before tumors grow so that BSE is a very effective method of early diagnosis from the aspect of cost-effectiveness.

(2) Possible conservative surgery: Same treatment effects could be obtained with conservative methods of surgery such as partial mastectomy that are possible when the tumor size is little. Although it is difficult to clearly interpret since no consensus was reached on the effectiveness of mastectomy and partial mastectomy, by early screening the rate of partial mastectomy was slightly higher in most cases.

(3) Psychological comfort: Although early screening offers psychological comfort by reconfirming no presence of cancer, there has not been a study that strategically measured its effectiveness.

5) Limitation of early screening

(1) Question on the effectiveness of early screening: Scientists have not come up to an appropriate answer to why is the incidence of breast cancer continue to increase despite a huge amount of investment made. According to statistics obtained through the cancer registry project in Connecticut, which is the oldest cancer registry project in the world, the incidence of breast cancer patients had been increasing by 1% each year since 1940. This increase became more severe by mid 1980's, reaching the level of 4% increase each year. The US National Cancer Institute reported that the increased incidence of breast cancer in US during the 1980's was due to the detection of tumors smaller than 2 cm according to the extensive application of mammography used in 3/4 early detected cases and claimed that the incidence of breast cancer with the tumor diameter more than 3 cm decreased actually after 1982. If this claim is to be true, the incidence of breast cancer should go back to that in the past. However, this is not the case so that the increase of 1% each year still remains. Moreover, if the increased number of patients with breast cancer was due to early screening, decreased mortality due to breast cancer should be noted immediately. But this trend is not still seen so that this claim is not convincing. Mortality due to breast cancer for the past decade is still remaining at 27 persons/100,000 population.

False positive or false negative results would be missed out when the diagnostic ability of the early screening method is not complete. For example, the sensitivity was reported to be 66.7～84.6% through CBE in Japan and 68～94% through mammography in US and some European countries. Furthermore, CBE is the method relying on visual observation and palpation; one could expect that it would not be easy to detect a non-palpable tumor through group screening. According to recent data in Japan, the rate of detection with CBE was 0.08～0.14%. Of course, about 50% of the detected cases were early stage cases. But this figure signifies that the detection rate through only CBE is 1 patient per 1,000 subjects examined. When CBE and mammography are used together, the detection rate was 74% according the HIP study and 97.2% according to the study done in Miyaki Prefecture, Japan. In other words, about 20～30% breast cancer patients are missed as false negative results. Furthermore, according to the BCDDP study, the sensitivity of BSE was very low at 26% in which it was highest in the 35～39 year old age group at 41% and was lowest in the 60～74 year old age group at 21%. Thus, the issue of false negative results would be the limitation.

(2) Unnecessary screening tests (false positive results): The issue of false positive results also becomes a problem in early screening. The specificity, the measure of accurately discriminating normal cases with no breast cancer, of mammography is 90%, which is not complete, so that about 10% are false positive results. False positive patients would continue to receive unnecessary screening such as mammography, Ultrasonography, biopsy and have to deal with physical and

psychological discomfort during this process. As an index representing the possibility of actually having breast cancer when early screening shows a positive result, the positive predictive rate of mammography is between 5～20% and is still lower in younger women. Furthermore, this index is still lower in countries having lower incidences of breast cancer such as Korea so that the issue of false positive results is another limitation of early screening for breast cancer.

(3) Excessive treatment: Diagnosis of patients with precursor stage by early screening is called lead time bias, and diagnosis of disproportional number of cases in patients with relatively slow clinical progression and long survival is called length time bias. Even if a screening test detected this stage of cancer in a woman, the problem rises when the woman does not develop clinical cancer. According to a study done in Denmark, breast cancer was not detected clinically in about 70% when autopsies were done in dead patients. Of course, not all precursor stage patients would progress to full-blown breast cancer patients. As mentioned earlier, the issue lies on unnecessary or excessive treatment in false positive cases through early screening.

(4) False assurance: Even if a person who was diagnosed as normal in recent screening develops breast cancer, the appropriate treatment time can be missed out when treatment is delayed due to overconfidence over the screening result.

(5) Discomfort: About 50% of the women who underwent mammography complained of more than moderate discomfort or pain.

(6) Radiation induced breast cancer: Although the development of breast cancer through screening mammography is very rare, according to the US National Institute of Health (NIH), the rate of breast cancer development throughout lifetime would be 150 persons/1 million population, provided that 35-year-old women are exposed to low dose radiation (0.12 rad) during mammography and these women receive mammography each year after the age of 40 years.

(7) Psychological burden: Women would feel psychological burden when they undergo early screening or know about the presence of breast cancer through early screening.

3. Recommendations made in other countries

1) Japan

Japan is the only country in Asia screening for breast cancer at the national level starting 1987. This country started the screening project in 1987 when mortality due to breast cancer

Year	Subjects	CBE	Mammogram
Adopted in March 2000	Non-symptomatic people	40～49 years: yearly Older than 50 years: biannually	40～45 years: baseline mammography Older than 50 years: biannually 40～49 years: yearly Past history and family history of breast cancer: biannually

Organizations	Recommendations
American Cancer Association American college of Radiology, American Obstetrics and Gynecology Society, American Medical Association	40～49 years: annual CBE, mammography in 1～2 years Older than 50 years: annual CBE, annual mammography
American Academy of Family Physicians (AAFP)	30～39 years: CBE in 1～3 years 40～49 years: annual CBE Older than 50 years: annual CBE, annual mammography
American Medical Association (AMA)	Between 50～74 years: biannual mammography Under 49 years, Older than 75 years: mammography not necessary.
Canada	50～69 years: annual CBE, annual mammography Under 49 years: opposed to mammography

drastically increased during the 1980's (Adult Health Promotion Act). Although 6% decrease was seen in mortality with breast cancer screening done in women older than 30 years through CBE according to a 5-year follow-up study, this decrease was only 2% when a 10-year follow-up was done; thus, they concluded that mortality due to breast cancer could not be reduced through only CBE. According to a cohort study done in women older than 50 years of age at Miyagi Center for 2 years from 1989 to 1991, the rate of early detection was significantly higher when mammography was used in conjunction with CBE compared to when only CBE was done. Thus, Japan started to manage breast cancer at the national level starting March 2000 with following recommendations.

2) USA

Many programs are being introduced by various organizations on breast cancer screening. One characteristic is that different organizations have different views on screening in women in 40's as in the case of mammography. However, annual mammography and CBE are accepted as effective programs in women in 50's and 60's.

4. Current situation in Korea

It is not possible to apply guidelines of other countries in Korea when the incidence of breast cancer is significantly lower. Therefore, considering from the fact that breast cancer is prevalent in women much younger than in Western countries, the aspect of investment cost, and preventive effect of disease at the same time, it would be necessary to establish the guidelines of screening befitting the Korean women.

1) Current system of screening in health insurance

A. Subjects

- Insured through employee health insurance:
  Entire blue-collar workers (once a year)
  The candidates for the year among white-collar workers (once every 2 years)
- Insured through regional health insurance (self-employed):
  The candidates for the year among heads of households and household members under the age of 40 years (once every 2 years)
- Family members of employees: Among the candidates for the year among family members older than 40 years (but the entire family members of government employees) (once every 2 years), those who wish to receive screening
  * Although those heads of households and employees who were older than 40 years of age were the candidates who could go under screening for specific cancers in 2000, the scope was expanded to include all self-employed and family members of employees who were older than 40 years of age in 2001.

B. Items of screening and screening methods

Items of screening	Candidates
1. Palpation by doctors	Women who wish for screening
2. Mammography (both breasts)	
- Shooting (twice)+ Reading (twice)	Abnormal findings according to breast palpation
- Film cost (CT film)	
3. Histologic examination	Abnormal finding after mammography
- Fine aspiration needle biopsy	

2) National cancer screening project

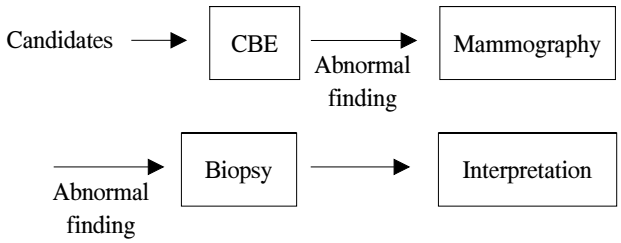
Women older than 40 years of age

Health insurance

- Those candidates who are to undergo screening every two years but did not undergo screening even once would have priority.
- When the file for candidates of screening was constructed as of January 2002, the candidates selected for screening were the adults older than 40 years who were born in even years and based on the amount of medical insurance premium
- Employees: Bottom 20% based on the monthly payment
- Self-employeed: Bottom 20% in the amount of insurance premium per household

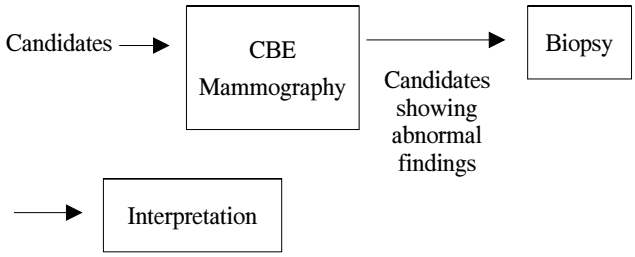
Candidates of health insurance

- CBE by doctors is to be performed initially, and mammography is performed only those showing abnormal findings according to CBE.



Recipients of Medicare

- Mammography would be the screening method. CBE by skilled physicians would be recommended. However, mammography is not recommended only those with palpable tumors.



3) Current status of breast cancer screening in private medical facilities

As shown in the above Table 3, the screening rate is very low. However, the current situation would be more accurately determined when we examine the screening result done in some general hospitals.

5. Proposal on early screening for breast cancer

The biggest benefit offer by screening for breast cancer is that death could be prevented through early detection. Although the methods of screening may differ, the preventive effect of screening on death is only accepted in women older than 50 years of age but is still controversial in women under 50 years.

Table 3. Rate of examination for cancers by national medical insurance (Unit: persons, %)

	Entire candidates	Rate of examination for cancers (rate of examination)			
		Stomach cancer	Colon cancer	Liver cancer	Breast cancer
Total	4,864,505	46,199 (0.95)	24,365 (0.50)	8,492 (0.17)	20,470 (0.42)
Family members of company employee	3,490,321	27,444 (0.79)	11,967 (0.34)	3,625 (0.10)	5,928 (0.17)
Family members of government employees	1,374,184	18,755 (1.36)	12,398 (0.90)	4,867 (0.35)	14,542 (1.06)

Data: Analysis on medical check-up results in Korean people in 1999, National Health insurance Corporation
Data: Analysis on medical check-up results in Korean people in 1998, National Health insurance Corporation

	Samsung Jeil Hospital	Seoul Asan Hospital (Choi *et al.*)	Yongdong Severance Hospital (Kim *et al.*)
Number screened	51,170	43,329	13,889
Age (yrs)	25～79	18～86	30～85
Age distribution	50's-40's-30's	40's-30's-20's	30's-50's-40's
Screening methods	Annual CBE, mammogram	Annual mammogram	Annual mammogram
Recall rate	9.9%	5.1%	13%
Biopsy rate	2.1%	2.5%	6.0%
Number of breast cancer (1/1000)	1.9	1.2	1.2
Ductal carcinoma in situ(DCIS)	22.4%	29.3%	17.8%
1st stage caner	31.6%	55.4%	17.7%

As shown in the above table, screening is recommended once a year in most screening centers. However, screening is recommended annually or biannually in US and European countries having high incidences of breast cancer. Thus, it would be questionable whether frequent screening would be economically feasible in Korea having a low incident of breast cancer.

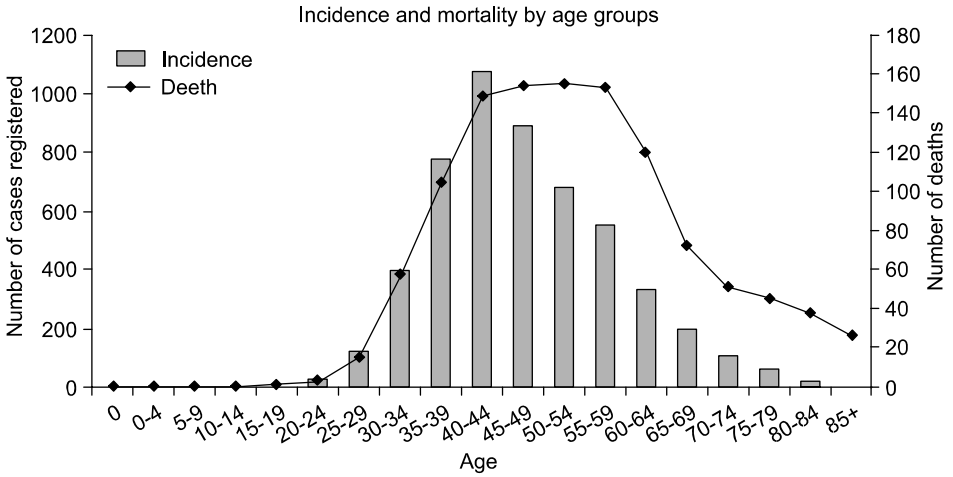


Fig. 2. Statistics on causes of death from National Statistical Office (1999). Annual report on cancer registry project in Korea, the Ministry of Health and Welfare (1999).

Thus, it would be logical to recommend the guidelines for screening by distinguishing young women into high-risk group and low-risk group based on risk factors. On the other hand, the issue of false negativity is serious since a low sensitivity of a screening method would miss out actual patients. On the contrary, the issue of false positivity, in which normal people are diagnosed as breast cancer patients, would be less serious since the specificity is relatively high, it would pose a problem in Korea where the incidence is low compared with other countries. Furthermore, when we consider the westernization of age curve, which is expected to increase to the levels of Western countries in the future, the preventive guideline should be set up based on the epidemiological findings. The strategy for early diagnosis should be changed entirely when preconditions change.

Among different items to be considered in screening test, sojourn time and lead time are important. Sojourn time is the time required for symptoms to appear from earliest cancer that could be diagnosed. Lead time is the time required for cancer detected through screening to show symptoms. Knowing sojourn time is important in establishing a breast cancer screening program. The ideal time would be when sojourn time and lead time would be identical. Early diagnosis is not possible when the period of screening test is longer than the sojourn time, and unnecessary testing is done when it is shorter. It is realistically difficult to establish sojourn time since it differs significantly according to individuals, age and histologic types of breast cancer.

Tabar *et al.* reported that sojourn time is 1.7 years in people between 40～49 years, 3.3 years between 50～59 years, and 3.8 years between 60-69 years, showing cancer would grow faster as the patient is younger. In other words, duality would exist when this time frame is considered by which screening should be done within a short period of time between 1～2 years in case of Korea since the incidence of breast cancer drastically increases after the age of 35 years and reaches the peak in 40's; however, too many unnecessary tests could be done, considering the low incidence (Fig. 2).

Furthermore, most of the studies on risk factors of breast cancer in Korea are limited to patient-control groups, limitation exists on personnel who would be utilized and facilities for studies on early diagnosis of breast cancer, and no study was attempted to evaluate effective modality of early diagnostic methods. However, the following were recommended at the first conference by experts for the development of the guidelines on early screening for breast cancer hosted by the National Cancer Center of Korea and Korean Breast Cancer Society held on July 24, 2001.

Recommendations by the National Cancer Center and Korean Breast Cancer Society
Older than 30 years: annual BSE
Older than 35 years: biannual CBE by physicians
Older than 40 years: annul or biannual CBE by physicians annual or biannual mammography

Further studies would be needed on the economic feasibility and effect of decreased mortality due to breast cancer over these recommendations; however, they are appropriate

considering the current situation of medicine in Korea.

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